In [81]:
```
import numpy as np
import math
import math116
from collections import Counter
```

In [6]:
```
math116.inverse(11,19)
```

Out[6]: 7

In [8]:
```
math116.euclidean(11,19)
```

Out[8]: (1, 7, -4)

In [12]:
```
(3*7*11+3*4*19)
```

Out[12]: 459

In [14]:
```
n=9006401
```

In [21]:
```
(n-1)/64
```

Out[21]: 140725.0

In [22]:
```
(2**140725)%9006401
```

Out[22]: 1680600

In [23]:
```
1680600**2%9006401
```

Out[23]: 9006400

In [24]:
```
9006400**2%9006401
```

Out[24]: 1

In [26]:
```
n/(1680600+1)
```

Out[26]: 5.359035844915003

In [102…
```
def Miller_Rabin(n,a):
    m=n-1
    k=0
    while m%2==0:
        m//=2
```

```
        k+=1
    b_0=a**m%n
    if b_0==1 or b_0==n-1:
        return True
    else:
        for _ in range(k-1):
            b_1=b_0**2%n
            if b_1==n-1:
                return True
            elif b_1==1:
                return math.gcd(n,b_0-1)
            else:
                b_0=b_1
        if b_0%n!=n-1:
            return math.gcd(n,b_0-1)
```

In [111…

```
Miller_Rabin(9006401,3)
```

Out[111…

```
5197
```

In [112…

```
def Fermat(n,a):
    if a**(n-1)%n==1:
        return True
    else:
        return False
```

In [116…

```
Fermat(9006401,7)
```

Out[116…

```
False
```

In [ ]: